What is claimed is:

1. A method for increasing the traffic handling performance of an elevator driven by a drive motor having a pre-designed power required to move the elevator according to a design velocity profile when there is a full load on the drive motor, the method comprising:

measuring the actual load in the elevator for a particular trip;

determining if the actual load represents a partial load on the drive motor;

calculating an optimized velocity profile for the trip, the optimized velocity profile being a function of the pre-designed power of the drive motor and the actual load; and

programming the drive motor to execute the optimized velocity profile for the trip.

2 The method according to claim 1, wherein the optimized velocity profile has a maximum velocity greater than the maximum velocity of the design velocity profile.

3. The method of claim 2, further comprising:

comparing (i) the maximum velocity of the optimized velocity profile, (ii) a maximum velocity attainable for the distance of the trip; and (iii) a maximum velocity attainable with the mechanical equipment of the system,

choosing the lowest velocity from said comparison; and

programming the drive motor to execute a velocity profile utilizing said lowest velocity.

4. The method according to claim 1, wherein the optimized velocity profile has an acceleration rate greater than the acceleration rate of the design velocity profile.

5. The method according to claim 1, wherein the optimized velocity profile has a jerk rate greater than the jerk rate of the design velocity profile.

6. A method for increasing the traffic handling performance of an elevator driven by a drive motor having a pre-designed power required to move the elevator according to a design velocity when there is a full load on the drive motor, the method comprising:

measuring the actual load in the car for a particular trip;

determining if the actual load represents a partial load on the drive motor; and

calculating an optimized velocity higher than the design velocity for the system, the optimized velocity being a function of the pre-designed power of the drive motor and the actual load according to the following relation:

$$VEL_{opt} = \frac{HP \times 33{,}000 \times EFF}{\left| ((1-(cw \div 100)) \times CAPA) - L_{actual} \right|} \qquad (2)$$

where,

VEL_{opt} = the optimized velocity attainable for the actual load (fpm)

HP = pre-designed power of the motor (in horsepower)

EFF = the efficiency of the system (a known value),

cw is the counterweight (as a % of the maximum car capacity)

$CAPA$ is the maximum car capacity (lbs.),

L_{actual} = the actual load inside the car; and

programming the drive motor to execute the optimized velocity profile for the trip.

7. The method according to claim 6, further comprising:

comparing (i) VEL_{opt}, (ii) a maximum velocity attainable for the distance of the trip; and (iii) a maximum velocity attainable with the mechanical equipment of the system;

choosing the lowest velocity from said comparison; and

programming the drive motor to execute a velocity profile utilizing said lowest velocity.

8. An apparatus for increasing the traffic handling performance of an elevator driven by a drive motor having a pre-designed power required to move the elevator according to a design velocity profile when there is a full load on the drive motor, the method comprising:

means for measuring the actual load in the elevator for a particular trip;

means for determining if the actual load represents a partial load on the drive motor;

means for calculating an optimized velocity profile for the trip, the optimized velocity profile being a function of the pre-designed power of the drive motor and the actual load; and

means for programming the drive motor to execute the optimized velocity profile for the trip.

9. The apparatus according to claim 8, wherein the optimized velocity profile has a maximum velocity greater than the maximum velocity of the design velocity profile.

10. The apparatus of claim 9, further comprising:

means for comparing (i) the maximum velocity of the optimized velocity profile, (ii) a maximum velocity attainable for the distance of the trip; and (iii) a maximum velocity attainable with the mechanical equipment of the system choosing the lowest velocity from said comparison; and

means for programming the drive motor to execute a velocity profile utilizing said lowest velocity.

11. The apparatus according to claim 8, wherein the optimized velocity profile has an acceleration rate greater than the acceleration rate of the design velocity profile.

12. The method according to claim 8, wherein the optimized velocity profile has a jerk rate greater than the jerk rate of the design velocity profile.

13. An apparatus for increasing the traffic handling performance of an elevator driven by a drive motor having a pre-designed power required to move the elevator according to a design velocity when there is a full load on the drive motor, the method comprising:

means for measuring the actual load in the car for a particular trip;

means for determining if the actual load represents a partial load on the drive motor; and

means for calculating an optimized velocity higher than the design velocity for the system, the optimized velocity being a function of the pre-designed power of the drive motor and the actual load according to the following relation:

$$VEL_{opt} = \frac{HP \times 33{,}000 \times EFF}{\left| ((1-(cw \div 100)) \times CAPA) - L_{actual} \right|} \qquad (2)$$

where,

VEL_{opt} = the optimized velocity attainable for the actual load (fpm)

HP = pre-designed power of the motor (in horsepower)

EFF = the efficiency of the system (a known value),

cw is the counterweight (as a % of the maximum car capacity)

$CAPA$ is the maximum car capacity (lbs.),

L_{actual} = the actual load inside the car; and

means for programming the drive motor to execute the optimized velocity profile for the trip.

14. The apparatus according to claim 13, further comprising:

means for comparing (i) VEL_{opt}, (ii) a maximum velocity attainable for the distance of the trip; and (iii) a maximum velocity attainable with the mechanical equipment of the system;

means for choosing the lowest velocity from said comparison; and

means for programming the drive motor to execute a velocity profile utilizing said lowest velocity.

15. An apparatus for increasing the traffic handling performance of an elevator driven by a drive motor having a pre-designed power required to move the elevator according to a design velocity profile when there is a full load on the drive motor, the method comprising:

a load weighing component for measuring the actual load in the elevator for a particular trip; and

a controller component including:

(a) a load determining unit for receiving information from the load weighing component and determining if the actual load represents a partial load on the drive motor;

(b) a calculating unit for generating an optimized velocity profile for the trip, the optimized velocity profile being a function of the pre-designed power of the drive motor and the actual load; and

(c) a programming unit for programming the drive motor to execute the optimized velocity profile for the trip.

16. An apparatus according to claim 15, wherein the calculating unit generates an optimized velocity profile according to the following relation:

$$VEL_{opt} = \frac{HP \times 33{,}000 \times EFF}{\left| ((1-(cw \div 100)) \times CAPA) - L_{actual} \right|} \qquad (2)$$

where,

VEL_{opt} = the optimized velocity attainable for the actual load (fpm)

HP = pre-designed power of the motor (in horsepower)

EFF = the efficiency of the system (a known value),

cw is the counterweight (as a % of the maximum car capacity)

CAPA is the maximum car capacity (lbs.),

L_{actual} = the actual load inside the car.

17. The apparatus according to claim 16, wherein the controller further comprises a comparator unit for comparing (i) VEL_{opt}, (ii) a maximum velocity attainable for the distance of the trip; and (iii) a maximum velocity attainable with the mechanical equipment of the system, and the programming unit programs the drive motor to execute a velocity profile utilizing the lowest velocity from said comparison.

18. A method for increasing the traffic handling performance of an elevator driven by a drive motor having a pre-designed maximum available torque, the method comprising:

measuring the actual load within the car for a particular trip;

modeling a range of velocity profiles based on the actual load and information for the particular trip;

calculating the resulting torque demand and travel time for each profile; and

selecting the velocity profile with the shortest travel time for the trip and with a torque demand that does not exceed the maximum available torque of the drive motor.

19. The method according to claim 18, further comprising selecting the velocity profile having acceleration/jerk rates the do not impose undue discomfort on the passengers for the trip.

20. The method according to claim 19, further comprising selecting a velocity profile that is within the mechanical safety limitations of the system.